

## CLAIMS

What is claimed is:

1. A system for cooling a semiconductor die, comprising:

a die having plurality of micro-channels; and

5 a condenser in fluid communication with the micro-channels, wherein die heating vaporizes fluid at the die to force fluid towards the condenser.

2. A system of claim 1, further comprising a plate coupled with the die for sealing the micro-channels such that the micro-channels form a plurality of fluid conduits for the fluid.

10 3. A system of claim 2, the plate being formed of semiconductor material.

4. A system of claim 3, the plate being selected from the group consisting of glass and silicon.

5. A system of claim 1, further comprising fluid selected from the group consisting of water, Fluorinert and alcohol.

15 6. A system of claim 1, further comprising a first fluid conduit for coupling cooler fluid from the condenser to the micro-channels.

7. A system of claim 6, further comprising a first header for coupling the first fluid conduit to the micro-channels.

20 8. A system of claim 1, further comprising a second fluid conduit for coupling warmer fluid from the micro-channels to the condenser.

9. A system of claim 8, further comprising a second header for coupling the second fluid conduit to the micro-channels.

10. A system of claim 1, the micro-channels being shaped for preferential fluid flow along one direction in the micro-channels.

25 11. A system of claim 1, the condenser being constructed and arranged above the die wherein gravity pressurizes cooler condenser fluid towards the die.

12. A system of claim 1, further comprising at least one orifice for restricting fluid flow through at least one of the micro-channels, for preferential fluid flow along one direction in the micro-channels.

13. A system of claim 1, the condenser comprising one or more fins for enhancing heat transfer to air adjacent the condenser.

14. A method of cooling a semiconductor die, comprising the steps of:  
flowing fluid through micro-channels formed into the die;  
communicating fluid from the die to a condenser arranged above the die;  
cooling fluid at the condenser; and  
communicating fluid from the condenser to the micro-channels.

15. A method of claim 14, the step of flowing comprising flowing fluid through the micro-channels bounded, at least in part, by a semiconductor element coupled with the die.

16. A method of claim 15, the semiconductor element comprising one of silicon and a glass plate.

17. A method of claim 14, further comprising the step of shaping the micro-channels for preferential fluid flow along the micro-channels.

18. A method of claim 14, the steps of communicating comprising utilizing headers coupled with the micro-channels.